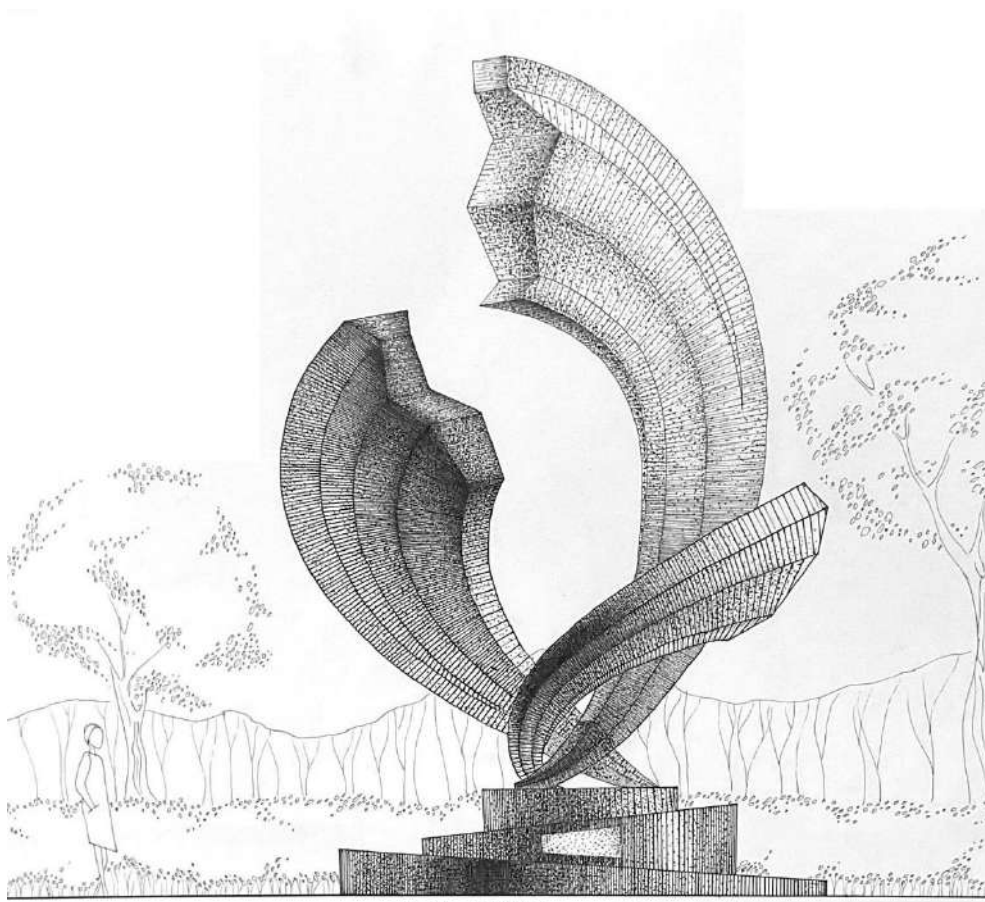


Ministry of Science and Higher Education of the Russian Federation  
Federal State Budgetary Educational Institution of Higher Education «Nizhny Novgorod State University  
of Architecture and Civil Engineering»

S.M. Shumilkin, M.S. Shumilkin  
M.A. Yakovlev, A.A. Romanova

# **ARCHITECTURAL DESIGN**

*The educational and methodical manual*



Nizhny Novgorod  
2024

Ministry of Science and Higher Education of the Russian Federation  
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## **ARCHITECTURAL DESIGN**

The educational and methodical manual  
on execution of term papers and term projects on the discipline of Architectural  
Design and Architectural Design for students of 1-2 courses of 07.03.01  
Architecture

Nizhny Novgorod  
NNGASU  
2024

Shumilkin, S.M. Architectural design : textbook / S.M. Shumilkin, M.S. Shumilkin, M.A. Yakovlev, A.A. Romanova ; Ministry of Education and Science of the Russian Federation, Nizhny Novgorod State University of Architecture and Civil Engineering – Nizhny Novgorod : NNGASU, 2024. – 33 p. – 1 CD ROM. – Text: electronic.

The educational and methodical manual intended for students of NNGASU for students at NNGASU on 1-2 courses for course work and projects in the discipline "Architectural Design" and "Architectural and design planning" directions 07.03.01 Architecture.

The educational and methodical manual summarises the work experience of the Department of History of Architecture and Fundamentals of Architectural Design of NNGASU. Each task has a list of literature in Russian language necessary for fulfilment of the task. On the first course two course works in each semester are carried out, on the second course - two course projects in each semester.

There is given the goals and objectives of the discipline, the basic requirements for the performance of term papers and projects, the topics of assignments. There is made a list of literature necessary for fulfilment each task. There are included examples of academic works and projects, carried out at the Department of History of Architecture and Fundamentals of Architectural Design.

The educational and methodical manual contains 33 figures, 65 bibliographic titles.

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## 1 COURSE

### Coursework №1. "Orthogonal drawing of an architectural structure"

**The purpose of the task** is to reveal the three-dimensional structure of the building, analyze its constructive solution, convey the artistic idea of the architect-author using the main means of compositional analysis (arch. drawing and arch. drawing).

#### **Project objectives:**

- Get acquainted with the proposed literature.
- Get acquainted with the architectural structure of its environment, conduct a graphic investigation of the spatial structure of the object: viewing points, proportions of the building, the composition of the main structural volumes of the building.

#### **The working process is organized as follows:**

- execution of 4 exercises (on A3 papers);
- execution of the draft project (on tablet 55x75 cm);
- execution of the final (clean) copy (on tablet 55x75 cm).

Students should make an architectural drawing of a building in orthogonal projections using the results of compositional analysis and methodological materials.

The work is carried out step by step in accordance with the plan of course work № 1: from sketches of the location of projections on a tablet (55x75 cm) to sketch the drawing in ink, observing the rules of the sequence of execution from the thinnest lines to the lines of section and plan.

The language of the coursework is English.

**Technique of execution of the project** - line graphics, outlining with ink using lines of different thickness.

#### **Composition of the project:**

- Facade, Scale 1:50 (linear scale is possible);
- Plan, Scale 1:100;
- Section, Scale 1:100;
- General Plan, Scale 1:200 – 1:500;
- Entourage, Staffage;
- Abstract, project name (name of the drawn building), projection signatures, corner stamp.

### **Topics of tasks:**

1. Towers of the Nizhny Novgorod Kremlin of the XVI-XIX centuries (Nikolskaya, Dmitrovskaya, Chasovaya);
2. Chatygin's Chambers (XVII c.) in N.Novgorod;
3. Olisov's Chambers (XVII c.) in N.Novgorod;
4. Pushnikov's Chambers (XVII c.) in N.Novgorod;
5. The Church of St. Euthymius in the Pechersky Monastery (XVII c.);
6. Archangel Cathedral in the Nizhny Novgorod Kremlin (XVII c.);
7. The Church of the Assumption in the Pechersk Monastery (XVII c.);
8. Pokrovskaya wooden church in the village of Zelenoye (XVII c.);
9. Shchelokov's dwelling house, Varvarskaya str. 8 (XIX c.);
10. Nikolskaya church on Pozharskogo street in N.Novgorod (XXI c.).

In parallel with the implementation of the stages of work on the architectural drawing, it is necessary to perform 4 exercises on an A3 sheet of paper:

– architectural drawings (3-4) on A3 paper in linear pencil graphics. One of the drawings from the most characteristic point should be made on a larger scale. It is important to pay attention to the nature of the architectural form of the building and identify its geometric structure, preserving the lines of construction. Also pay attention to the entourage. One of the drawings (master plan) should reflect the situation around the structure, indicating the viewpoints from which the other drawings are made.

– linear graphics – drawing of lines (straight, curved, radial, thick, thin, solid, discontinuous, conjugation of lines of different shapes);

– entourage and staff – the image of vegetation (trees, bushes, lawns, people, cars, buildings) in the projections of the facade and plan (3-5 variants of the graphic image);

– a font composition consisting of the drawing of 4-5 characteristic letters of various shapes with a size of 6x6 cm; also a font composition consisting of the main inscription of yours graphic work (font height 18-20 mm); annotations to the building in question (font height 3.5-5 mm), signatures of projections and a stamp of the work in the lower right corner (font height 2.5-3.5 mm).

### **Corner stamp example**

NNGASU FAID GR. *group number 20\_.*

VERIFIED: *Surname First name of the teacher*

PERFORMED BY: *Surname First Name of the student*

ННГАСУ ФАИД ГР. *номер группы 20\_ Г.*

ПРОВЕРИЛ: *Фамилия Имя преподавателя*

ВЫПОЛНИЛ: *Фамилия Имя студента*

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## Coursework №2. "Tectonic systems in architecture "

Theme - architectural orders.

Course work on architectural orders is one of the most important in the creation of creative thinking of future architects.

**The purpose of the task** is to study architectural orders; Improving graphics skills; Mastering of the foundations of design and compositional activity based on classical architecture and its plastic "language".

### **Objectives:**

- Analysis and evaluation of the architectural composition of the order: its modular construction, tectonics, proportions;
- Comparison of the order of a specific monument of architecture with the corresponding canonical order.

To perform a graphical work, a order system developed by the Italian architect and theoretician D. Vignola.

You need to do a home graphic exercise on the topic: - a schematic drawing of canonical orders in a single module on Vignola (Doric, Ionic, Corinthian) and a schematic drawing of the architecture monitoring architecture. The drawing includes orders with intercolumns. The sheets should be indicated by the names of orders and the main dimensions in the modules. The drawing is performed on the A3 sheet in the pencil.

### **Drawing contents:**

- the drawing includes a full-height image of two orders (canonical and specific architectural monument) showing intercolumnia, sections and shades with capital plans in a single module.
- the composition of the drawing includes elements of the facade of the monument;
- main inscription "Architectural Orders", font "Zodchiy";
- brief historical background;
- comparative table of main order sizes;
- modular line;
- corner stamp.

### **Requirements:**

- technique of execution - pencil drawing with the use of different thickness of lines, the drawing is made on a stretcher 55x75 cm.
- compare two orders by a single module;
- when performing the work, it is possible to limit the depiction of decorative cuts in a generalized form and partially show a complex ornamental pattern. This also applies to the redrawing of capitals, to the showing of cannelures on column trunks and to the plans of capitals on plafonds;
- Ionic and Corinthian orders (canonical and architectural monument) should be arranged in a vertical composition with 1.5-2 columns in pairs, maximizing the height of the subframe with the placement of plafonds in the gaps between the columns.

Doric order (canonical and architectural monument) can be placed on the stretcher in a horizontal composition.

**Sequence of course work execution:**

- study the theoretical material;
- determine the correlation between canonical and specific orders by completing the “Architectural Orders” exercise;
- perform an exercise;
- to make layouts of orders in masses and compose them on the tablet;
- after the teacher has approved the general composition of the sheet, draw the orders in pencil in thin lines in full volume;
- draw all the inscriptions, execute all the ornaments;
- approve sketch drawing at departmental review: the sketch drawing includes a complete layout of the sheet, fine line drawing of all projections, lettering, and partial outlining (30-50%) with major line thicknesses in plans and sections;
- make a finish drawing of the architectural orders.

**Tasks - examples of architectural monuments with orders:**

Doric order:

1. Portico of the Golitsyn hospital in Moscow, 1796-1801.
2. Portico of the Alexeevskaya Church of the Annunciation Monastery, 1829 r.
3. The Exchange in St. Petersburg, arch. T. Thomon, 1810.

Ionic order:

1. Portico of the wing of the Golitsyn hospital, 1796-1801.
2. Pavilion of the Anichkov Palace in St. Petersburg, architect K.I. Rossi, 1818.
3. Loggia of the Public Library in St. Petersburg, architect K.I. Rossi, 1834.
4. House of O.I. Kamenskaya in Nizhny Novgorod, Arch. B.A. Korshunov, 1913.
5. Building of the Noble Assembly in Nizhny Novgorod, 1826.
6. The residential house of E.E. Evenius in Nizhny Novgorod, 1836.

Corinthian Order:

1. Column Hall of the Noble Assembly in Moscow, architect M.F. Kazakov, 1780s.
2. Frolov's (I.S. Vereninov) residential house in Nizhny Novgorod, 1840.

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# АРХИТЕКТУРНЫЕ ОРАДЕРА

ВЕНЕЦΙΑНТИНТИФ			
В. К. А.	В. С. А.	В. С. А.	В. С. А.
П. А. Н.	4.5 М. А.	2.8 М. А.	М. А.
В. И. Т. Е. Р.	4.5 М. А.	2.8 М. А.	М. А.

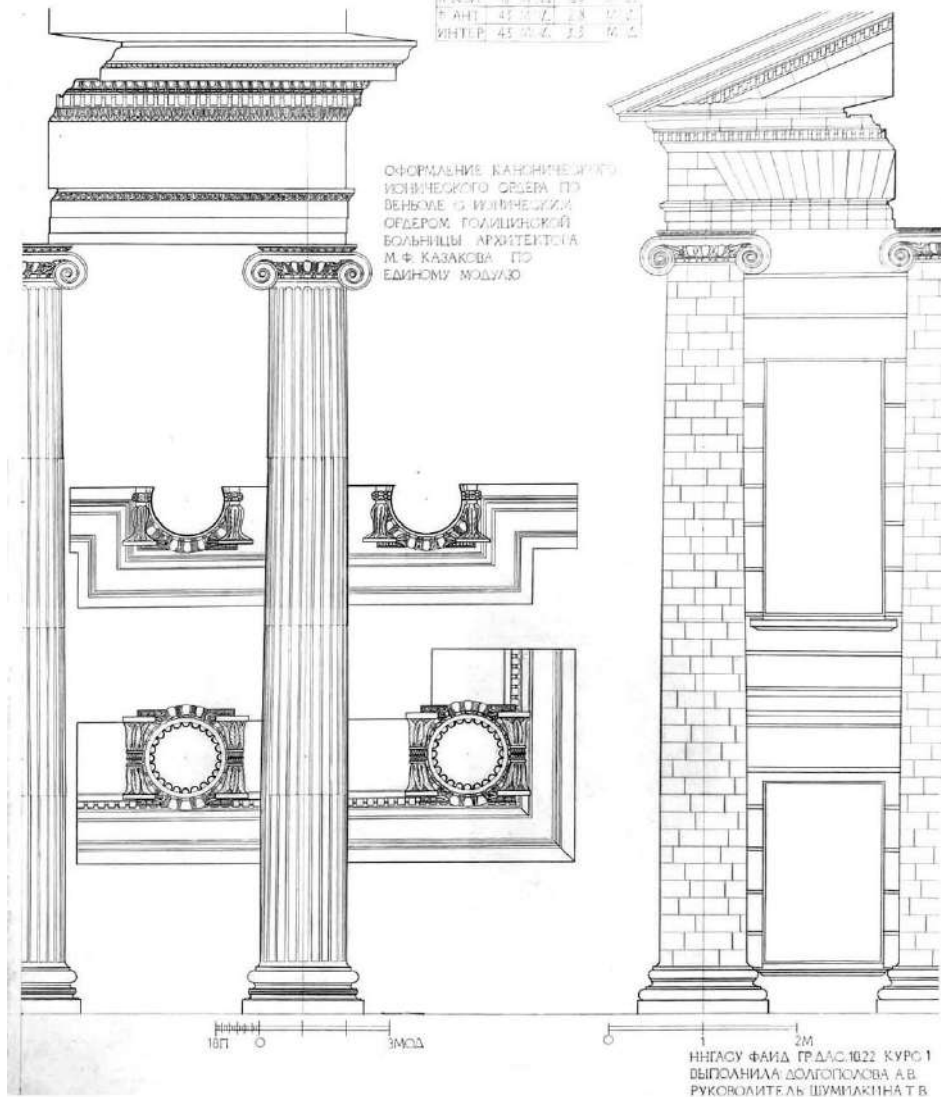


Figure 3. Architectural orders. Ionic order. Study work

# АРХИТЕКТУРНЫЕ ОРДЕРА

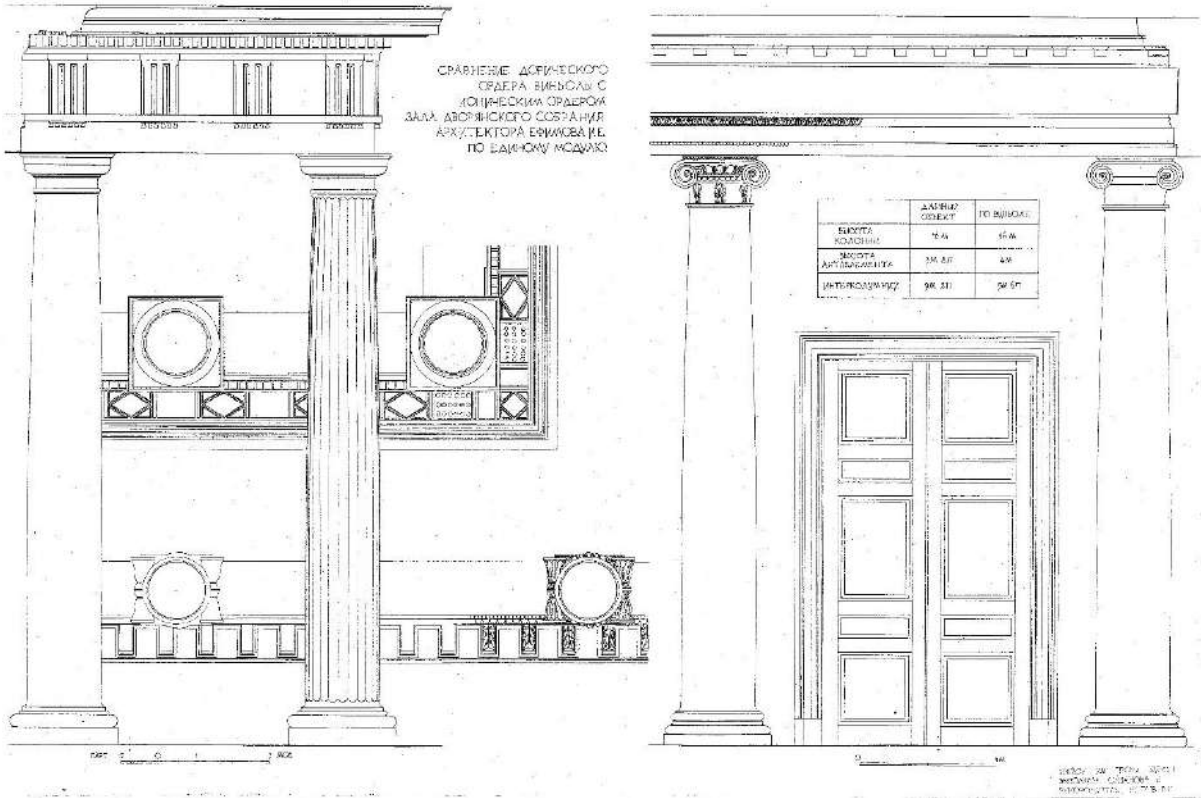


Figure 4. Architectural orders. Doric order. Study work

# АРХИТЕКТУРНЫЕ ОРДЕРА

СРАВНЕНИЕ ДОРИЧЕСКОГО ОРАДЕРА ПО ТРАКТАТУ ВИНОЛЫ С ДОРИЧЕСКИМ ОРАДЕРОМ ЕРМИНОВА В ОРИЕНТАХ - ПЕТЕРБУРГЕ ПО ЕДИНЬОМУ МОДУЛУ.

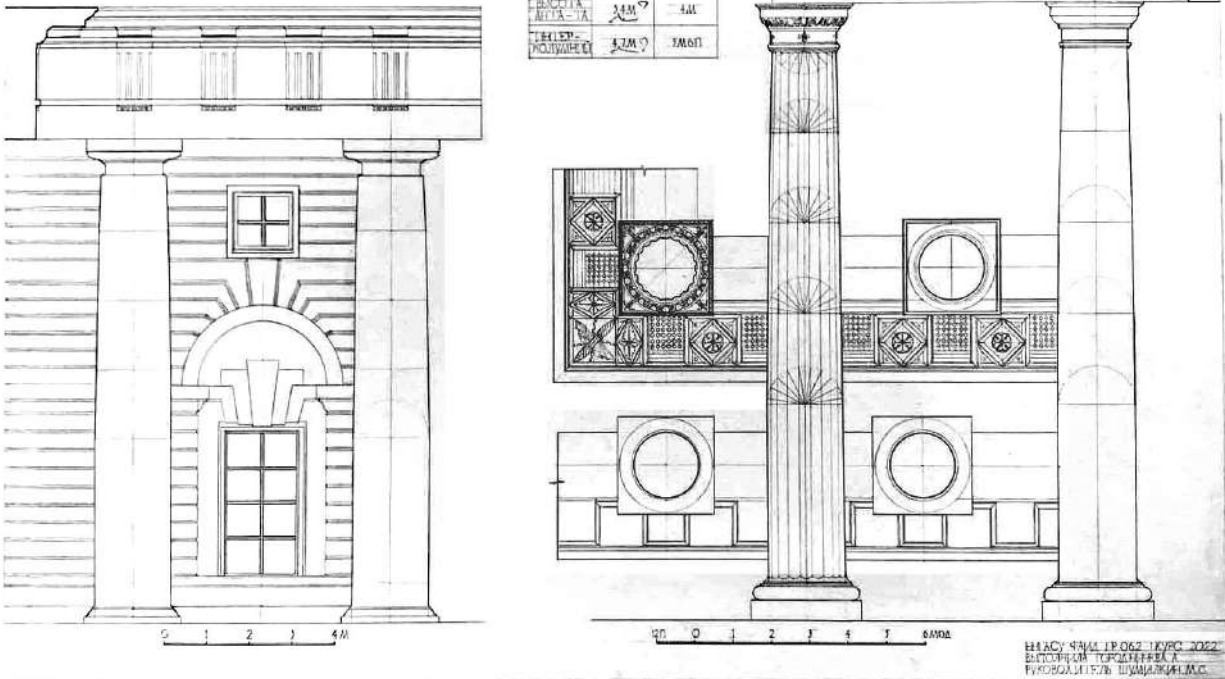


Figure 5. Architectural orders. Doric order. Study work

## **Coursework №3. "Typographic composition in architecture"**

### **Project topic "Annotation board "**

**The purpose of the task** is to master the principles of font compositions and their application in architecture. To design an artistic solution of an annotation board for a specific architectural monument of Nizhny Novgorod, in your own form and font graphics, reflecting the style features of the building

#### **Project objectives:**

- make a layout of the chosen font on the plane of the board;
- to think over the technology of execution of fonts, decorative details, such as chamfers, grooves, straps, architectural chips, or profiles;
- to propose a material or several different materials, to think over their combination (granite, marble, wood, metal) taking into account the material of the wall of the architectural monument, to make a precise choice of the font garniture;
- decide how to fix the designed board on the plane of the building facade, find a worthy place for it on the monument, determine its proportions and shape.

#### **The working process is organized as follows:**

- execution of 1 exercise (on A3 paper);
- execution of the draft project (on tablet 55x75 cm);
- execution of the final (clean) copy of the project (on tablet 55x75 cm).

#### **The composition of the project:**

A facade of the board in real size, with drew shadows and the specific materials of the board itself and the wall material. The project is made on a paper of wattman stretched on a tablet of 55 cm x 75 cm.

The technique for the final (clean) copy of the project is ink tinting, showing the texture of the using materials.

**The draft drawing** is made on a 55 cm x 75 cm tablet with the construction of falling and own shadows and 100% light and shadow modelling, including the plane of the wall on which the board is placed.

The technique of the draft project is mixed: ink tinting combined with pencil shading.

#### **Examples of annotation board texts**

1. The Church of Myrrh-bearing Women. Built in 1649. Architectural monument.

*Dobrolyubova Street, 13.*

2. Chambers of the merchant Chatygin. Built in XVII century. Architectural monument.

*Pochayinskaya Street, 27.*

3. Church of the Assumption. Built in 1672 at the expense of merchant A.F. Olisov. *Krutoy per., 3.*

4. Noble Assembly. Built in 1826. Architect I.E. Efimov. *B. Pokrovskaya Street, 18.*

5. The house of the Yermolayevs. Built in 1840. Architect G.I. Kizevetter. *Ilyinskaya street, 96.*

6. Seminary building. Built in 1827-1831. Architect A.L. Leer. *Pl. Minin and Pozharsky, 4.*

7. The Rukavishnikov estate. Built in 1875-1877. Architect P.S. Boytsov. *Verkhnevolzhskaya nab. 7.*

8. Church of the Ascension. Built in 1875. Architectural monument. *Ilyinskaya Street, 54.*

9. Spasskaya Church. Built in 1903. Architect A.M. Kochetov. *M. Gorky Street, 177.*

10. Kamensky mansion. Built in 1914. Architect B.A. Korshunov. *Verkhnevolzhskaya nab. 11.*

11. State Bank. 1911-1913. Architect V.A. Pokrovsky. *B. Pokrovskaya Street, 26.*

12. House of Soviets. Built in 1929-1931. Architect A.Z. Grinberg. *Nizhny Novgorod Kremlin.*

13. House - commune. 1932. Architect A.N. Tyupikov. Architectural monument. *M. Pokrovskaya Street, 14.*

14. Rukavishnikovs' trading house. 1911-1914. Architect F.O. Shechtel. *Nizhnevolzhskaya nab. 11.*

15. The gambling house of A.I. Troitsky. 1905-1908. Architectural monument. *Piskunov Street, 35.*



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Figure 6. Annotation board. Study work.



Figure 7. Annotation board. Study work.

## **Coursework №4. "Tinting of the facade of an architectural structure"**

The theme is tinting a facade or cut.

**Purpose of the task:** to master the techniques of tinting a facade or an cut section.

### **Objectives:**

- Study the object, the time of its creation, functional, style, design features and composition;
- Determine the character of the building's surroundings and its illumination;
- solve the composition of the drawing.

### **Composition of Work:**

Facade (cut) of a building with shadow construction, transfer of volumetric and spatial construction of the building with entourage, transfer of materials. The work is performed on a sheet of wattman stretched on a stretcher with the size of 55 x 75 cm. The scale of the drawing is linear.

Technique of execution - ink tinting.

### **Themes** of assignments for coursework:

1. Frolov's house on Ilyinskaya Street in Nizhny Novgorod (19th century);
2. Shchelokov's house on Varvarskaya Street in Nizhny Novgorod (19th century);
3. House of Evenius on Varvarskaya Street in Nizhny Novgorod (19th century);
4. Chatygin's Chambers in Nizhny Novgorod (17th century);
5. The Olisov Chambers in Nizhny Novgorod (17th century);
6. Pushnikov's chambers in Nizhny Novgorod (17th century);
7. The building of the Noble Assembly in Nizhny Novgorod (19th century);
8. The Kamenskaya mansion in Nizhny Novgorod (early 20th century);
9. The Exchange in St. Petersburg (19th century);
10. Pavilion of the Anichkov Palace in St. Petersburg (19th century);
11. Archangel Cathedral in the Nizhny Novgorod Kremlin (17th century);
12. The Church of St. Euthymius in the Pechersk Monastery (17th century);
13. Uspenskaya Church in the Pechersk Monastery (17th century);
14. The Alexeevskaya church in the Annunciation monastery (19th century);
15. St. Nicholas Church on Pozharsky St. in N. Novgorod (21th century);

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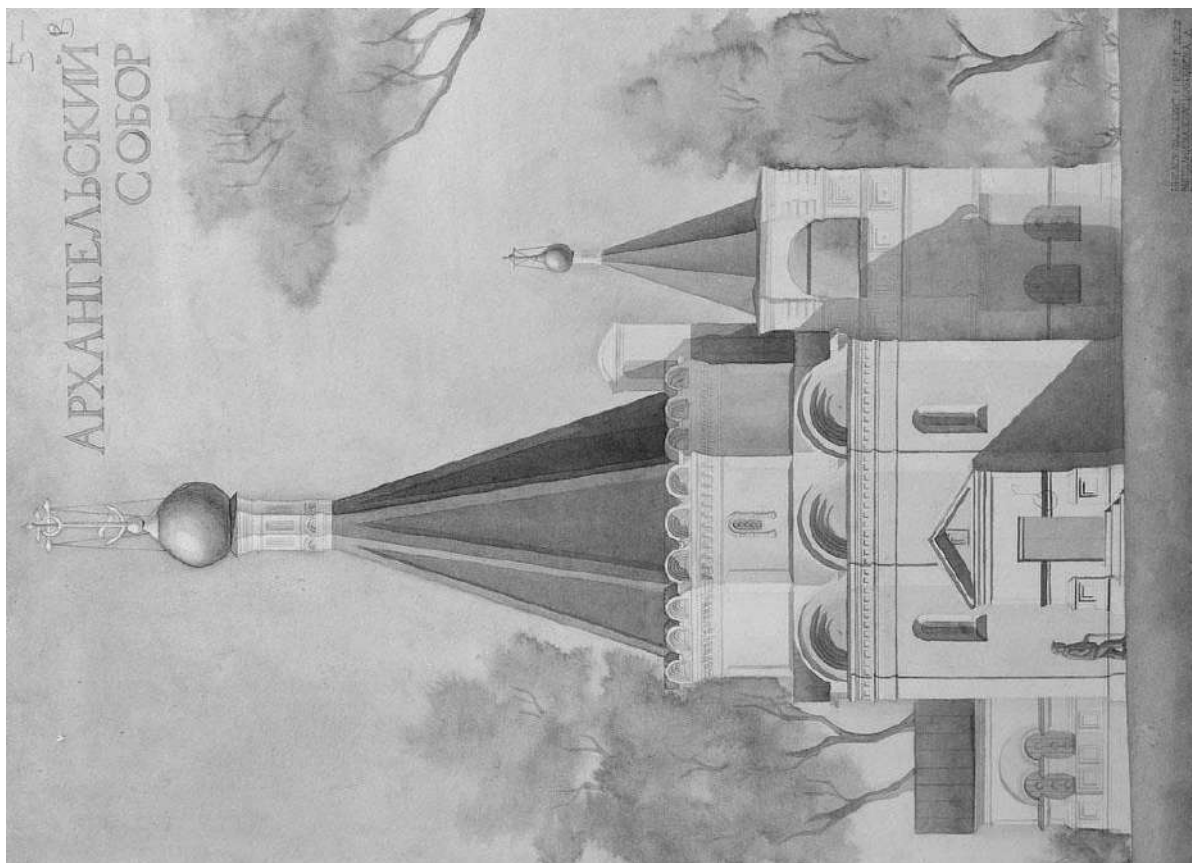


Рис. 8. Архангельский собор. Отмывка. Учебная работа



Рис. 9. Здание Дворянского собрания. Учебная работа

## 2 COURSE

### Coursework №1. " An architectural structure without interior space "

#### Project topic - a fountain in the park, a monument.

In the first academic project of the second year of study the student meets for the first time with the interaction of a small ensemble and landscape, with the task of architectural identification of the spatial dominant.

**The purpose of the task** is to solve the volumetric-spatial composition of a given structure with plastic elaboration of the ground surface.

#### **Project objectives:**

- Evaluate the character of the relief, existing buildings (structures) and configuration of the site, given the specific location
- Determine the overall composition of the fountain (monument), inscribed in the environment (to work out the landscaping of the site and its relationship with the projected structure).
- Plastically work out the individual elements of the structure.

#### **Requirements:**

The micro-ensemble includes the main large-scale form (fountain, monument) and complementary elements of landscaping (retaining walls, stairs)

The solution of the main form is determined by the author depending on the nature of the place. The student should pay attention to the silhouette and plasticity of the main form. The elements of the composition should be worked out in detail.

Recommended limiting dimensions for vertical development of the form are 4-8 m (not less than 3 m, not more than 10 m), for horizontal development - 6-15 m.

The area of the site (general plan) – 600-1000 m<sup>2</sup>.

The area of the fountain bowl or monument area – 25-50 m<sup>2</sup>.

#### **The working process is organized as follows:**

- abstract (on A3 paper);
- line graph exercise (on A3 paper);
- execution of the draft project;
- execution of the draft project (on tablet 55x75 cm);
- execution of a working (draft) paper model of a fountain (monument);



- execution of the final (clean) copy of the project (on tablet 55x75 cm);
- execution of the final (clean) paper model of a fountain (monument) – student do the model of his own volition.

The student, when executing the drawing of the project, works out the plasticity of architectural elements in line and stroke (color tinting is possible). The draft project includes drawing all projections with dimensions, elevations and captions in pencil and 30% ink outlining, including entourage.

The student, when executing the model, develops a general volumetric and spatial solution of the micro ensemble with the inclusion of an architectural object, treatment of the terrain, and landscaping of the adjacent territory.

### **Functional zoning.**

In the composition of the micro ensemble the student designs three conditional functional zones:

- entrance zone, the conventional main entrance can be fixed by the initial element of the general composition;
- transition zone, organizes the transition to the main form (fountain or monument);
- culmination zone, emphasized by the main form (fountain or monument).

### **Materials.**

Monolithic concrete, natural stone, metal, glass, etc. may be used as building materials.

**Technique of execution of the project** – line graphics, outlining with ink using lines of different thickness.

### **Composition of the project:**

- Facade (main projection), Scale 1:10, 1:20, (1:25, linear);
- Facade (side projection), Scale 1:50;
- Plan, Scale 1:50;
- Section, Scale 1:50 (1:100);
- Situation Plan, Scale 1:500, 1:1000, 1:2000;
- General Plan, Scale 1:200 (1:100);
- Inscription, signatures, stamp;
- Working model to the preliminary design, Scale 1:50.

### **Locations for design**

1. Square on M. Pokrovskaya St. (square of Afghans);

2. Park Kulibina (round area at the entrance from Gorky St.).

### **Literature**

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# ФОНТАН В ПАРКЕ

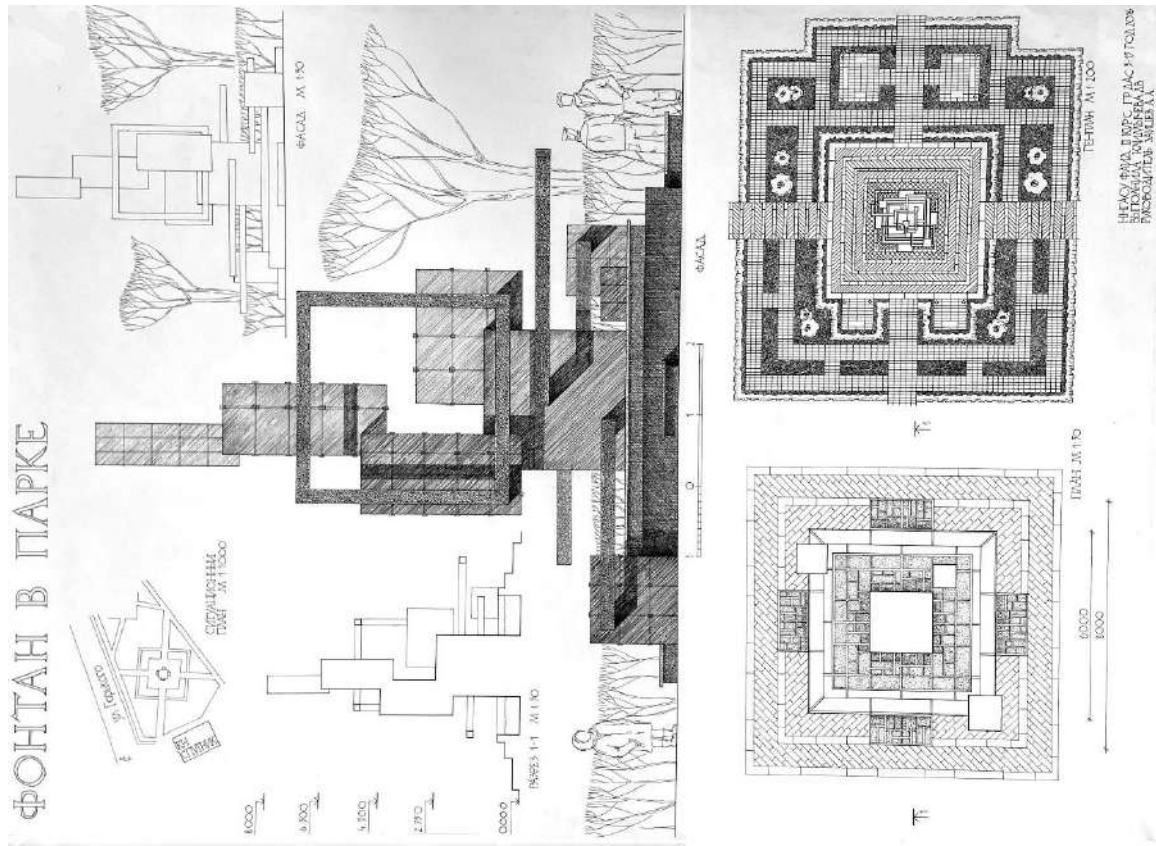


Figure 10. Fountain in the park. Study work.

# ФОНТАН В СКВЕРЕ

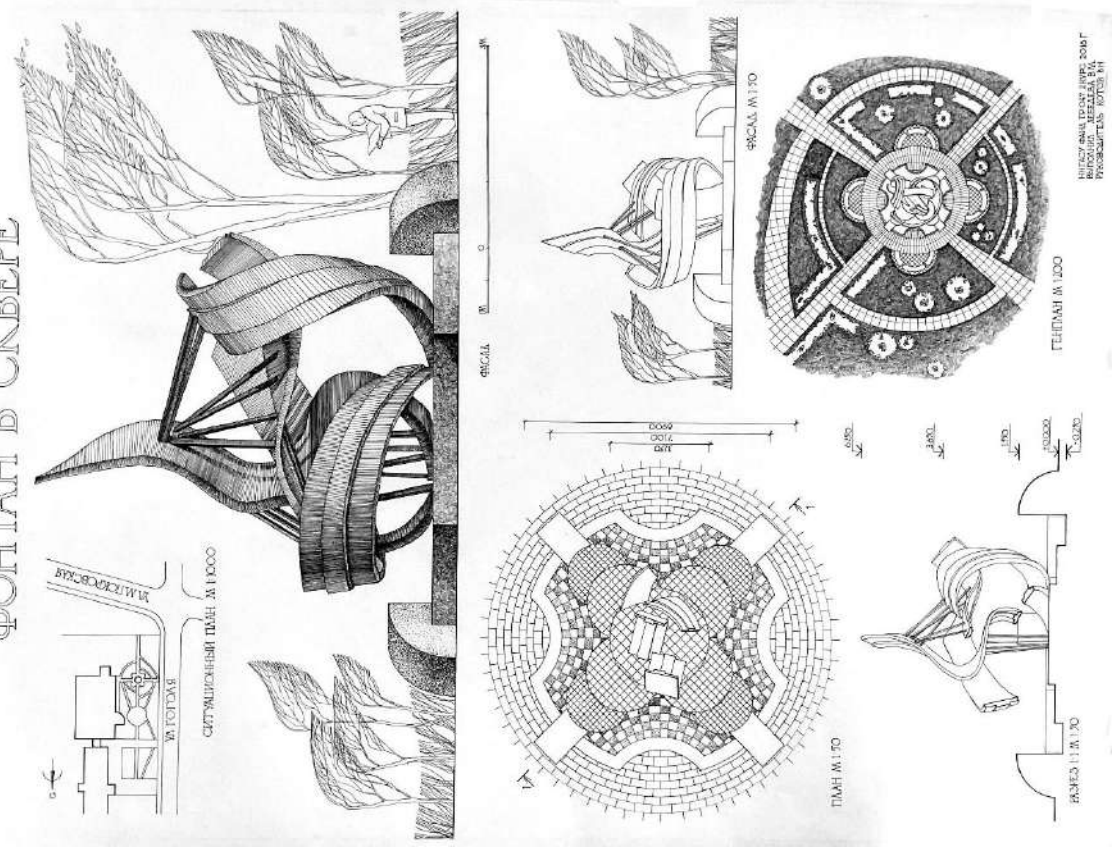


Figure 11. Fountain in the square. Study work.

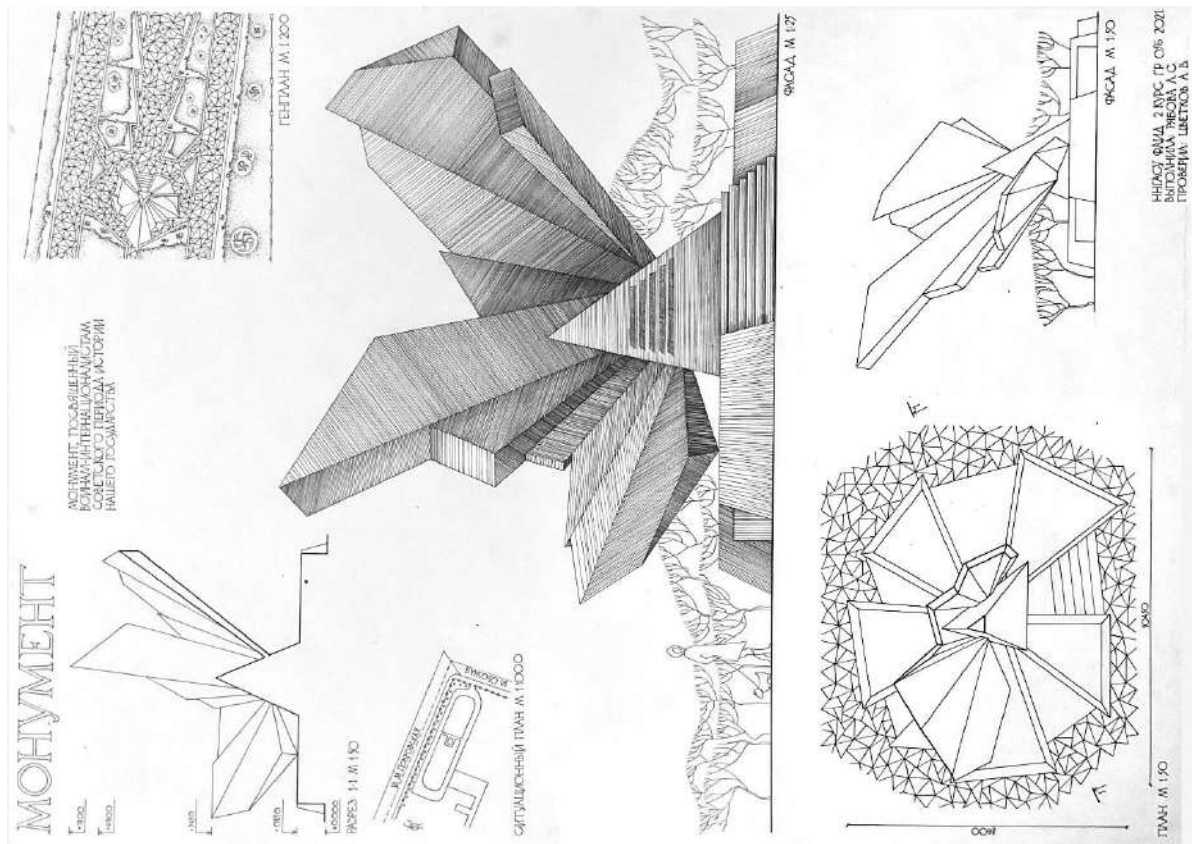


Figure 12. Monument. Study work.

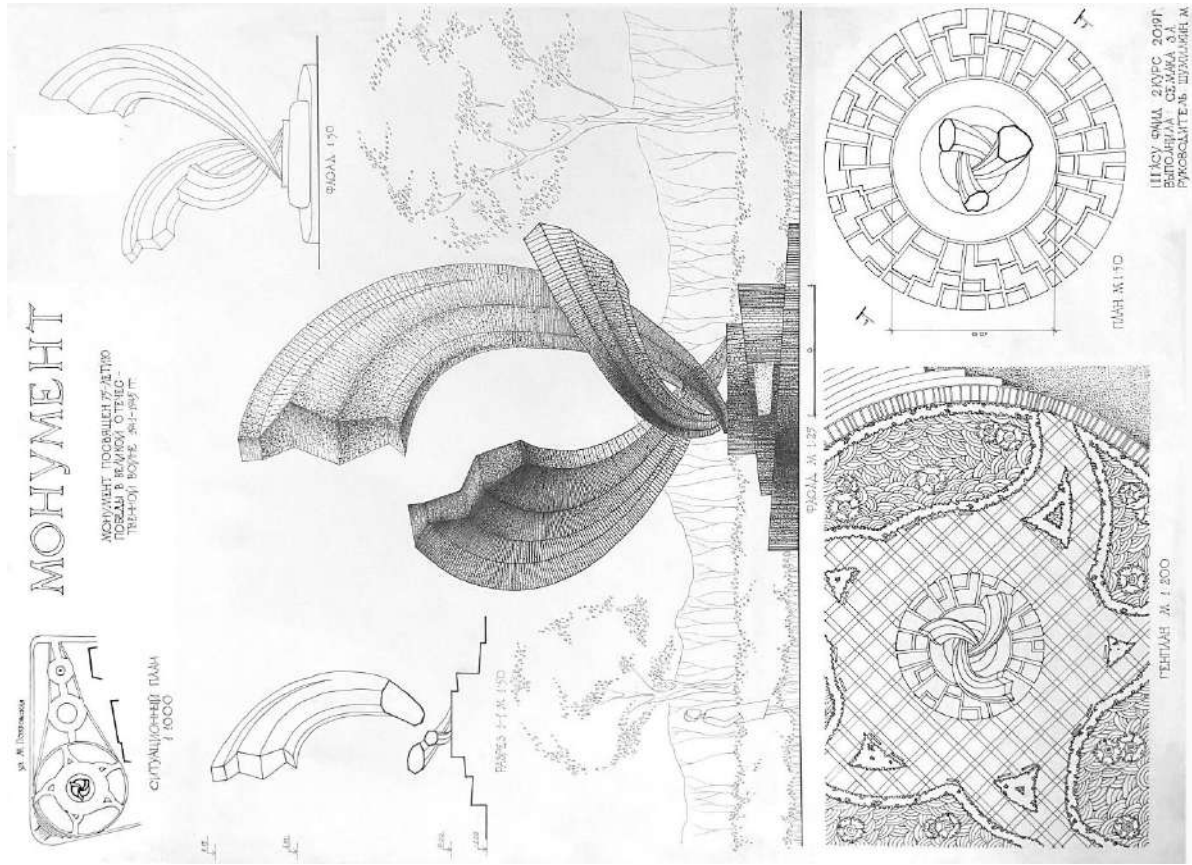


Figure 13. Monument. Study work.

## **Coursework №2. " Architectural structure with minimal function "**

### **Project topic – chapel.**

## **Coursework №3. " Settlement project "**

### **Project topic – a settlement of 1000 inhabitants.**

It is necessary to design a small settlement located near the city (cottage settlement - usually for permanent or long-term residence of local residents), which has arisen mainly by separation from the main settlement.

**The purpose of the task** is to familiarize students with the basic provisions in urban planning and to teach them how to solve some problems in urban planning practice.

#### **Project objectives:**

- to learn to work with normative-legal documents and design in accordance with urban planning requirements;
- to master the methodology of architectural and town-planning design, stages of town-planning activity and principles of zoning of territories, rules of architectural and town-planning structuring and systematization;
- to show a competent urban planning solution in the course project, to reveal the peculiarities of the planning structure of the settlement in accordance with the academic assignment.

#### **Requirements:**

Composition and dimensions of the territory area for the settlement:

- topographic base (Scale 1 : 5000, 1: 2000, 1:1000) is issued with a larger area than the required area for the central part of the settlement.
- first, the general planning structure of the settlement should be proposed (Scale 1:2000) and then the "central part" should be defined on it, which will be developed in detail in the general plan (Scale 1:1000).

#### **The working process is organized as follows:**

- execution of the sketch drawing express ideas is made as an independent work on A2 paper in any technique (Scale 1:2000). The drawing should show the planning structure of the village, zoning of territories (streets, community center, school, sports core, park, residential blocks without drawing buildings);

- execution of the abstract is made on A4 or A3 paper, where different examples of planning of settlements, organization of community centers, planning of school and kindergarten sites should be presented;
- execution of the sketch-idea of the planning structure of the entire settlement shall be made on a scale of 1:2000 with the boundaries of the central part of the settlement defined;
- execution of the draft project. Draft project is developed within the boundaries of the central part of Scale 1:1000 and is executed in the color tinting technique on a 55x75 cm tablet. The project is accompanied by a model of the public area of the settlement with adjacent residential buildings;
- execution of the final (clean) copy of the project (on tablet 55x75 cm).

**Composition of the project:**

- the inscription "SETTLEMENT" and the wind rose;
- situational plan (Scale 1:5000) indicating the territory for the prospective development of the settlement;
- master plan of the central part of the settlement (Scale 1:1000);
- table of symbols with the actual balance of territories;
- corner stamp.

**Technique of execution of the project** – color tinting with ink outlining. It is allowed to use computer graphics when executing the project.

**Composition of the projected settlement and functional zones.**

The settlement includes the following zones:

- the territory of the settlement for 1000 inhabitants is 40-50 hectares;
- the building line is determined by the boundary of the sanitary zone from the highway. The zone is established with a width of 25 m from the edge of the carriageway of the highway to the building line;

The settlement includes the following **functional zones**:

1. **Residential zone** consists of cottage and block buildings with land plots. The residential zone shall be represented by residential blocks of two types:

- estate building: each house or cottage with dimensions 10x10 m in plan is located on an individual plot of 600 to 1200 square meters, that is, 30 m along the street and 20-40 m in the depth of the block;
- block building: each residential unit 7-8 m along the facade, on the blocking sides - 11-12 m, the number of residential units in a group - from 4 to 8; the plot for one residential unit - approximately 400-500 sq.m.

According to fire protection requirements, the distance between manor houses and a group of block houses from the end is not less than 15 m.

## 2. **Public zone** includes:

- public-business zone: two buildings 15x18m and 15x36m in plan and a building 12x18m in plan for the housing and communal services institution. The total area of the center is not more than 1.0 ha;
- School site – 2 hectares. School – 2-storey building, 75x15 m in plan. Sports ground 30x60 m, bordered by a 4 m wide running track; the inner radius of the running track is 16 m;
- Medical assistant and obstetric station with a pharmacy kiosk - 0.2 ha;
- Kindergarten site - 0.2 ha;
- Recreational zone (park, squares, boulevards). The recreational zone is designed near public buildings on inconvenient territories.

For educational purposes, the priority is the compositional solution with the identification of the settlement structure, the location of the community center, the ratio of cottages and block houses is determined individually.

## 3. **Roads, streets, sidewalks**

Entry-exit to the settlement is the beginning of the main settlement street, located no closer than 150 m from the intersection of transit highways.

The length of dead-end streets is not more than 150 meters.

The width of the carriageway of the street is a multiple of the lane width (3.5m) and depends on the intensity of traffic: for the main street we take three lanes (11.5m), for residential streets – two lanes (7m), for passages – 1-2 lanes. Sidewalk width: for the main street – 3-4 m, for residential streets – 1-2 m, for local passages – 1 m.

## **Literature**

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3. Code of rules: SP 42. 13330. 2011, Urban Planning. Planning and development of urban and rural settlements.





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## **ARCHITECTURAL DESIGN**

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Architecture

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